Our 14th Year

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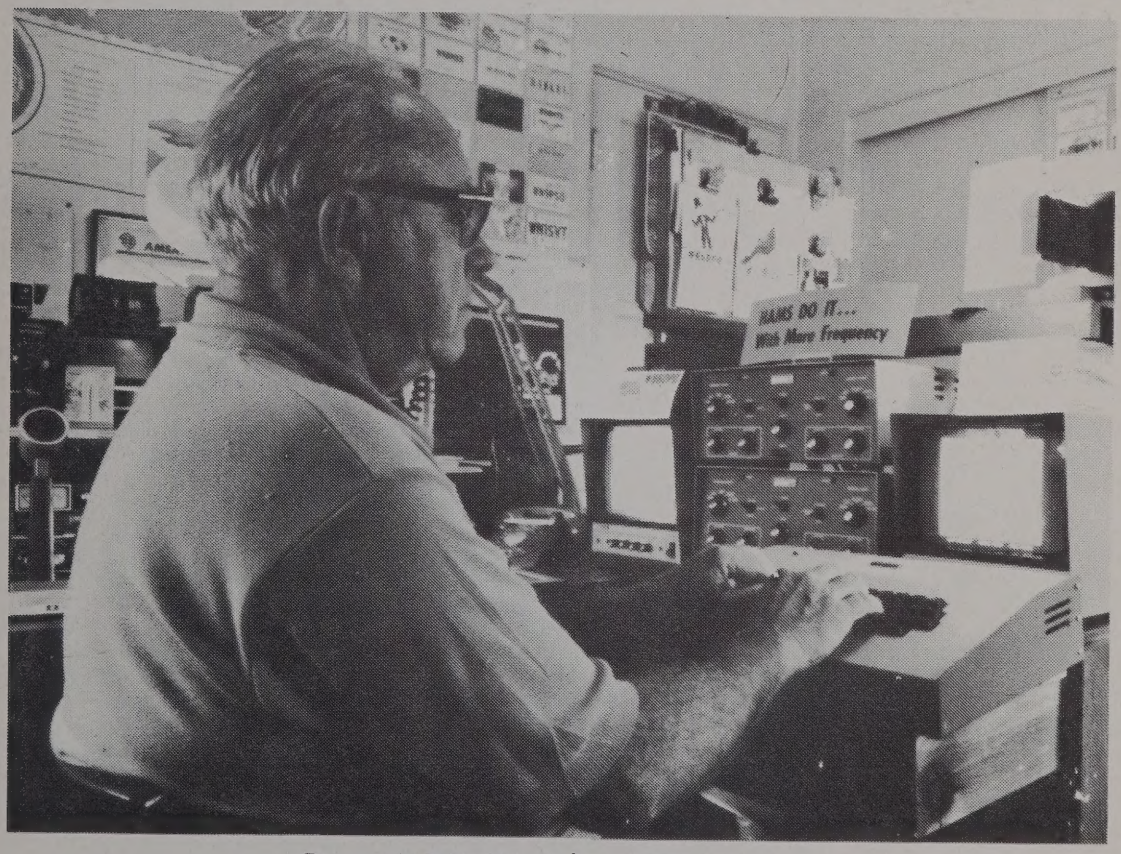
AMATEUR TELEVISION MAGAZINE

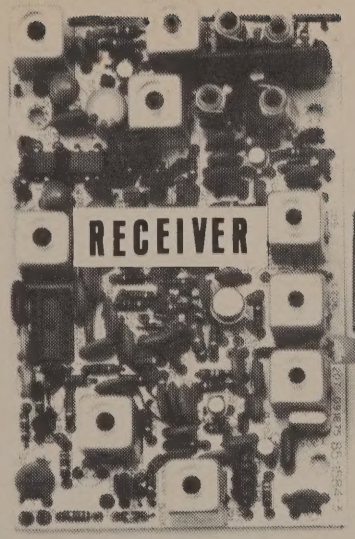
Sept.-Oct., 1980

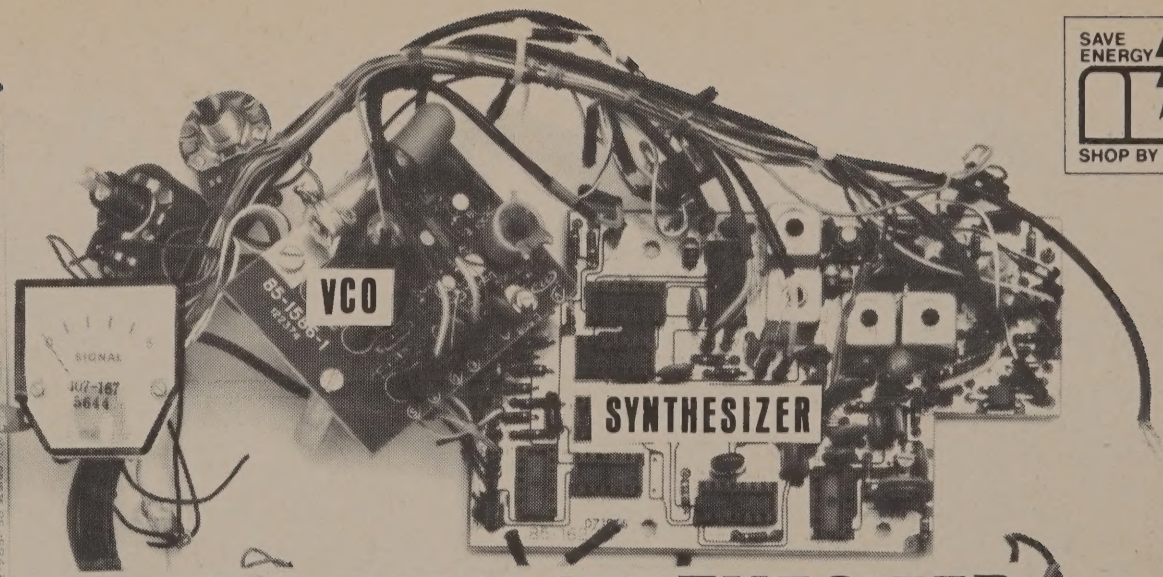
Vol. 10, No. 5

TWO TV CAMERAS YOU CAN BUILD EZ & CHEAP
PLUS 12 OTHER PROJECTS
AND MUCH MORE



Don WB6DPD & his SSTV Station





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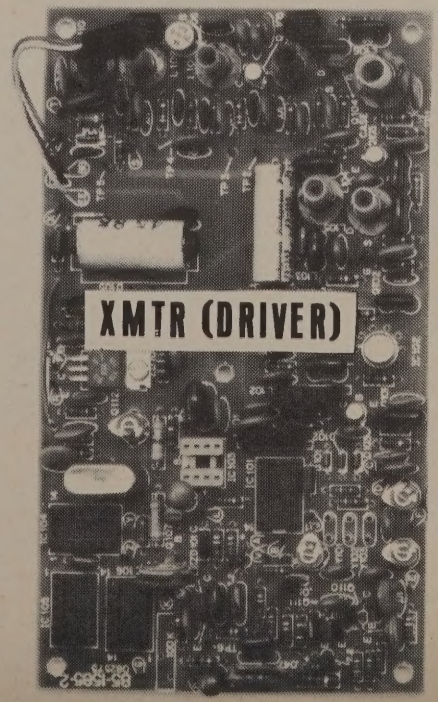

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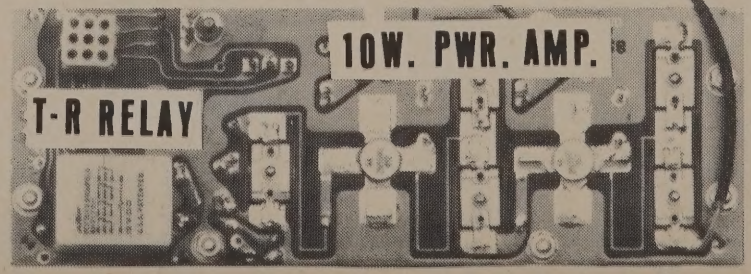

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OUR 131h YEAR!

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DEVOTED TO HAM TV

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Amateur Television Magazine

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NEWS

Well folks, by now we should be hearing if the FCC has approved the proposal made by your scribe to allow SSTV (joined by an appeal to allow FAX) on all voice portions of the 80 through 10 meter bands. This, if approved by the FCC would allow the SSTV activity to move up band and out of the DX portion of the phone band. Perhps this would help the situation where an abiding SSTV'er operating on one of the recognized SSTV frequencies is QRMed off the band by an errant contester. At least we will be able to move to a second recognized but as yet to be designated SSTV operating frequency in each band to avoid the QRMer.

In the Color SSTV converter, there is an error. (March 80 A5) The row of write counters designated as 1/8 FSTV vertical should be 1/8 FSTV HORIZONTAL. Also, on page 41, the upper H sync should be V sync. On page 42, the transistor numbers are reversed, the 2N2369 should be on the bottom. Thanks to several readers who wrote about these.

In the July 79 issue, the MRF 901 preamp has two errors. The resitor on the collector lead of the transistor is 100 ohms not 10 K, and the 100 pf cap on the base was on the wrong side of the bias line, it should be between L1 and the transistor base with the resistor connecting to the base for bias.

There was a sudden surge in ATV RPT news, such that we have deceided to include as much of it as possible in our next issue, as essentially a complete issue on ATV repeaters. This issue we are concentrating on quick and simple ATV projects to get you warmed up for winter.

Would you like to exchange ATV tapes with someone in England? If you have a VHS machine and record in the normal 2 hr mode, you can swap tapes with Andy G8PTH. He can generate compatable 525 line recordings in glorious black and white and PAL 4.43 color(!). Possible topics you chack, station equipment, local operation, repeater operation, station ID's from local broadcast stations. Hmmm, got some really cute out takes from my years with a TV network, perhaps he would like some bloopers? (ed).

Do you have any RCA monoscope tubes to spare? Andy would like to get a hold of an indian head testcard and any station ID tubes. More or less on a pay now collect later basis. Please write and let him know if you have, all costs refunded. Andy is building a small museum of classic TV equipment. He should visit the station I work for now. They have every item ever used since 1954!. Write to Andrew Emmerson G8PTH, 4 mount Pleasant, Blean common, Canterbury, Kent, England CT2 9EU, England. (and I thought some of the US addresses were wierd!)

HOT TIPS

Ron Priebe WB9MCF RR 1 Burnside, IL is looking for close-up, zoom or wide angle lenses for his robot 80A camera, c-mount. W9FHB writes, Interested in a nifty little inexpensive SSTV tuning circuit locking in on sync pulse and displaying four color grey scale tone on seperate LEDS? Write to him.

Transparent colored plastic provides excellent filtering for red colors in SSTV picture work as well as in camera pickup and background experimentation writes W7AMQ of Portland, OR. You can also use it for an inexpensive color mask (eliminate objects of certain colors) ed. - - - The Robot 400 has 64K of memory which if tuned on an RTTY or ASCII signal stores 8 seconds nicely and makes for a unique SSTV pattern which of course can be locked nto hold and retransmitted. Anyone know how to ignore or remove the sync pulse that prevents TTY recopy? WBØKFB, Jim, 419 23rd St. NE Cedar Rapids, IO 52402- - Anyone besides WBØQCD and myself experimenting with RTTY and SSTV for the deaf? Phoneline RTTY/SSTV? WB4APR, Bob, 907 ninovan Rd., Vienna, VA 22180.- - - I am looking for a schematic of a circuit board for a small 100 watt UHF TV TX between 400-806 Mhz. Dan Mahoney 8 Arlington St. Auburn, MA 01501. 617-755-9316.- - - Looking for Conrac VHF-UHF tuner convertable to 439.25 for ATV RPT W/YMN, Mike Hunt, PO Box 7, Le Claire, IO.

ONLY 125 COPIES OF ATV IN A NUTSHELL LEFT AS OF SEPT. 1, 1980 AND GOING FAST. ORDER NOW BEFORE ITS TOO LATE. $6.25 pp. US $7.50 pp DX

TD1 TONE DECODER

The TD-1 Tone Decoder board is a simple circuit to close a DPDT relay upon receiving a horizontal sync or audio tone of atleast 100 millivolts. The values of C1, C2, and C3 shown are for between 11 and 20 kHz and may be directly scaled for any frequency in the audio range. The detection bandwidth is approx. + and - 5%. Power requirement is +8 to +16 vdc at 100 ma when energized.

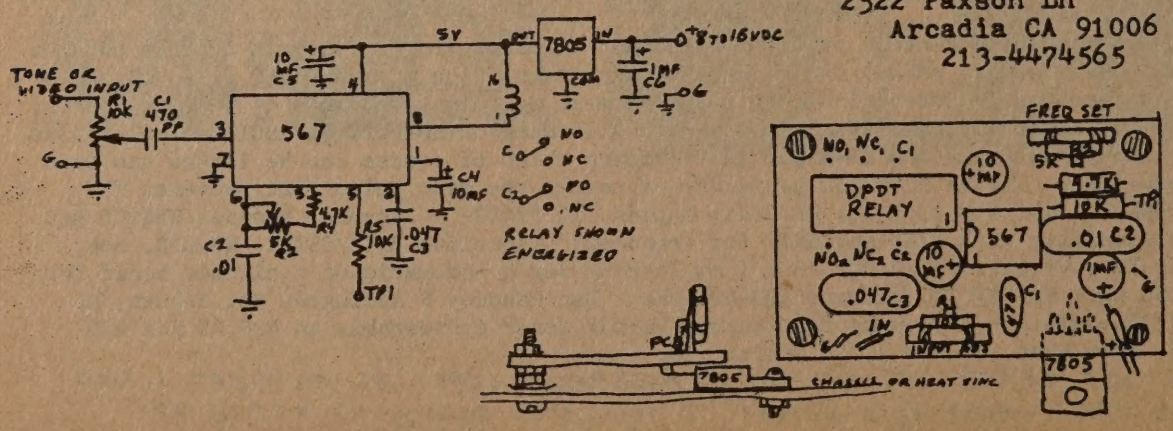
The board accepts Radio Shack catalog parts but others may be substituted as size permits. The frequency and loop caps must be mylar or other stable types for stability. The 7805 regulator IC must be mounted to a chassis or heat sink if the voltage applied is greater than 9V.

R1, the 10K input pot should be adjusted to apply 100 to 200 mv of the desired tone to pin 3 of the 567. Overdriving with higher levels increases the possibility of sub harmonics and other tones tripping the relay also. With no audio or tone at the input, the center decoding frequency can be set with the 5K (R2) pot while monitoring the square wave at the end of the 10K resistor (R5, TP1) with a frequency counter. If no counter is available a rough adjustment can be done by applying the tone input and slowly turning the freq. pot (R2) and finding the two dropout points of the relay and then splitting the difference. The square wave on TP1 can also be used as a frequency locked signal to drive other circuits. The value of the 10 mf cap at pin 1 may be increased if a longer dropout time and better noise imunity are desired at the expense of pullin time. The example shown is for switching a relay upon detecting the horizontal sync frequency of 15734 Hz as a COR for ATV repeater systems. Other applications might include decoding one of the DTMF touch tones for special functions or selective calling. In this case the three cap values would be increased 20 times. Depending on tone levels and other signals on with them prefiltering may be required.

PARTS LIST (11 kHz to 20 kHz values)

Resistors ¼W 10K, 4.7K
RS 271-217 5K trim pot R2
RS 271-218 10K trim pot R1
RS 276-1721 567 decoder IC
RS 276-1770 7805 5V reg IC
RS 275-215 5V DPDT relay
RS 272-1051 .01 mylar cap C2
RS 272-1052 .047 mylar cap C3
RS 272-125 470 pf disc cap C1
RS 272-1406 1 mf tant. cap C6
RS 272-1025 10mf radial cap (2)C4,5
TD-1 Tone Decoder PC board from
P. C. Electronics $5
2522 Paxson Ln
Arcadia CA 91006
213-4474565

W6ORG 8-80



SS1 VIDEO SYNC STRETCHER

Transistor linear amplifiers it is soon found are not very linear in the last half of their peak power. The popular 100 Watt dual MRF309 microstrip amp compresses the sync greatly above 50 watts. Mel of KLM was kind enough to send me one of their 110 watt amps to test for atv and find a way to get more than 55 useable watts out. Tubes are still the best bet for linearity as their internal parameters dont change much as drive and output increase. Transitors on the other hand exibit great impedance changes and RF collector to emitter swing limitations. It is not unusual for the last 3db increase in output power to take more than 6 db increase in input power.

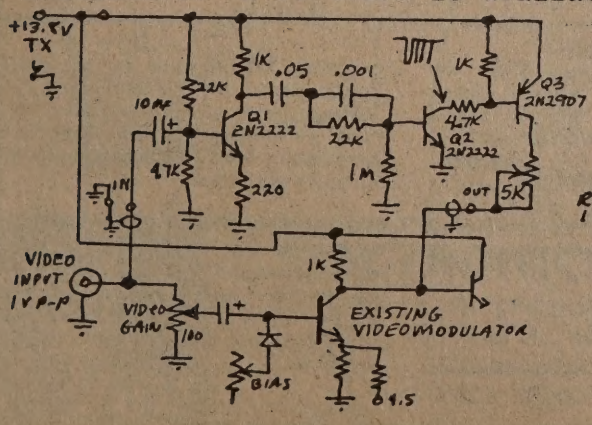
The sync compression shows up at the receiving end with a jittery or tearing picture. Experiments with a few TV sets and a video processor (proc amp) showed that most TVs can take up to 50% reduction in sync to video, and some down to 80% reduction. A lot depends on the tvs sync amp and separator. If the amp is really being pushed, you will also see a darker contrast picture. The best test is with a video ramp signal fed into the modulator and viewing the final RF modulation out on a scope connected to a DN-1 detector/ monitor driver. Or you can plot the amps input to output curve if you can vary the exciters power output. With my modulators it can be done by varying the modulator bias pot.

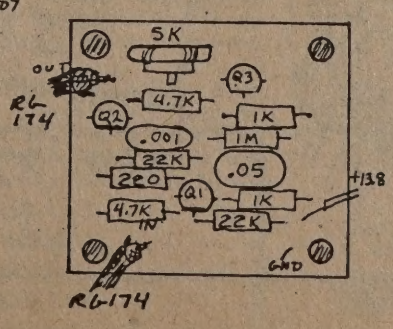
I did design a simple but effective sync stretcher that can be added to my modulators. It essentially pulls up the modulator to max power only during sync time. The video input first goes thru a video amp with a gain of 5. To get good sync separation with a diode clamp / transistor circuit a large video swing compaired to diode conduction (transistor base emitter) is desired. To keep noise and changes in the video average picture level (APL) from falsely triggering the separator a dual time constant is used in the clamp circuit. The .05 is for the vert. and the .001 is for the horizontal in conjunction with the 1 meg discharge resistor. The output of Q2 is just horiz and vert sync which is applied to a PNP transistor to pull up the modulator voltage to peak power during the sync time. A 5K pot is used to set the peak power point.

With the KLM 110 watt amp I set the no video in power out of the driver to 4 watts with the bias pot on the modulator. This gave 55 watts out of the amp...the sync was practically gone! Then I connected up the camera video and adjusted the 5K sync stretcher pot for the proper ratio on the scope...about 2/3 video to 1/3 sync. Peak power is now about 80 watts with the average about 55.

The TXA5-4 has this circuit etched on the board. This circuit can be added externally to older TXA5 exciters as well as VM-3 modulators. A PC board is available for $5 ppd or wired for $17 ppd.

73 de TOM W6ORG
(C) 6-80





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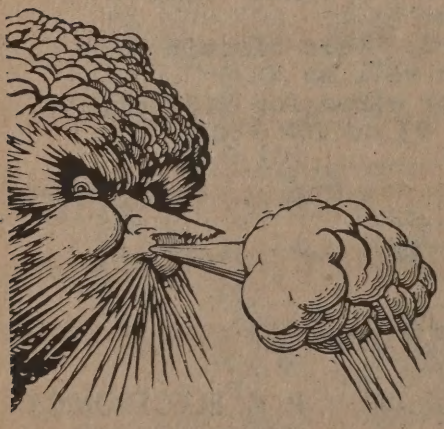
PRODUCT REVIEW. THE HITACHI GP-4 COLOR CAMERA. GREAT PIX FOR UNDER $1,000

Had an opportunity to use one of the new Hitachi GP-4 color cameras recently, and I was very suprised. Many of the one tube color cameras I had seen were only fair at best in color reproduction. Often, the color would be smeared (low definition) and under saturated, particularly in yellow and pastel colors. Most would do a fair job on blues, reds and greens, but anything else was poor at best. Well, imagine my suprise, when the color comming out of this beast was as good as some $16,000 cameras!!! The colors were fully saturated. The yellows (used a painted street curb) were great, and the sharpness of detail was amaizing! For an under $1,000 camera, equipped with a MACRO focusing 6:1 zoom and electronic viewfinder it was fantastic. The camera uses a new type of image tube with three targets. Exactly how this works I am not sure but apparently, they are stacked one behind the other. The low light level response was fantastic also. Most of the color cameras I had seen needed mucho light. Indoors, they were very poor to useless. The GP-4 performed well, with little noise. There is an L visable in the viewfinder which indicates low light, and even indoors, with only normal store/house lights, it worked well. Colors were bright, well saturated and noise was low. The automatic light compensation circuit is as good or better than the HV-62. You can have direct lights in the scene and they do not affect any of the other video. The video is compressed only on the bright lights, all other detail is fully visable. You can pan from bright sunlight to a dark room and the ALC will compensate fully. You do need to adjust the iris to prevent white compression if the entire scene is bright, but the viewfinder is wonderful for this. There is about a 4 F stop "window" of correctable light level in which the ALC will do all the correcting. Beyond thatm you will either be too dark (in which case the L will come on telling you to open the iris) or you will see the white compression in the viewfinder, and can adjust the iris. A built in color temp control works great too. Its a small meter and control on the side. Simply point the active camera at the scene, adjust the knob for a center scale reading, and "viola" perfect color balance. You can also use the color control to manually adjust the color balance if you want a "warm (red) or cold (blue)" tint. The range is such that between bright sunlight outdoors and incandescent or florescent lights I was able to balance the colors with range to spare. I picked the GP-4 to check out because it has been advertised as having been used by ABC for the winter olympic games. Sure enough, it is a good camera. Its quite rugged, and appears well made. It comes equipped with a 10 pin connector to mate with popular home VTRs. It operates from 12 volts DC, so you can use in anywhere you like (plane, boat, car, baloon, portable field day, etc) and when used with a portable VTR such as the Panasonic 6 hr unit, draws power from the VTR, otherwise, you can use a seperate battery, AC adaptor or power cord. Of the inexpensive color cameras, this is the best one I've seen so far. It is even better in some areas than its "big brother" the Hitachi GP-5, which sells for %50 more.

If you ever wanted to go color, but were afraid of the cheap cameras which needed several hundred dollars more for lens and viewfinder, and were unsure of the color quality, fear no more. I have no hesitation in recommending the GP-4 as a best buy and best performer for a low cost color camera. Considering that it comes with a great zoom lens and video viewfinder, it isn't much more than many of the "dumps" color cameras which require you to buy a lens and viewfinder after you paid $300-$400 for the basic camera. Henry KB9FO.



TV can spot twisters

If you live in a rural area where up-to-the-minute television weather coverage isn't available, your television can still warn you of an approaching tornado.

When weather looks threatening, turn your television to channel 13, and turn your "brightness" control until the screen is almost black. Then, turn to channel 2 and lower the volume.

Lightning will produce erratic, colored bands (white on black and white TV) of varying widths across the screen. **A tornado within 15 to 20 miles will produce a continuous, solid colored screen (white on black and white).**

If this happens, turn your set off and IMMEDIATELY seek shelter, taking along a battery-operated portable radio if possible. Amateur radio operators are obligated to assist communications during disasters, so be prepared with this simple detection technique.

Thanks to the Air Force *MARS* newsletter

KLM Superior-Quality VHF and UHF Antennas

2 Meters...

Two-meter beams deliver maximum gain and clean patterns, with VSWR of less than 1.2:1 across the entire 144-148 MHz range. High grade insulating materials, weather-resistant aluminum boom and elements. 12, 14 and 16-element beams make outstanding moon-bounce building blocks.

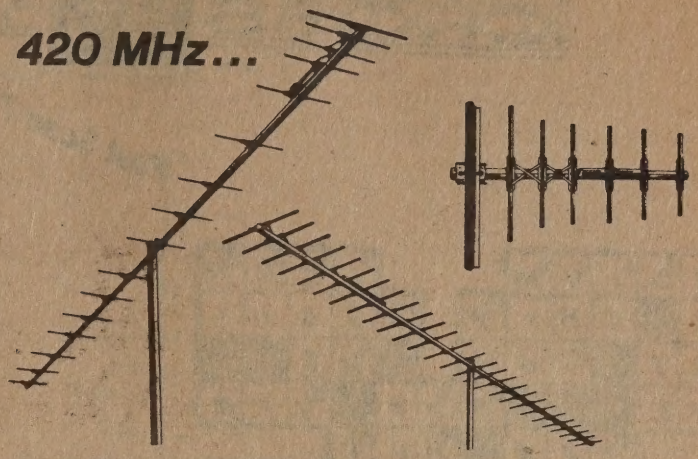
14-Element
KLM-144-148-14 $65.95

Gain: 14.2 dBd. Beam width at 3 dM pt.: 18 degrees. Feed impedance: 50 ohms balanced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 17.33'. Max. mast size: 1½". Center mounting. Wt.: 8 lbs.

16-Element
KLM-144-148-16 $72.95

Gain: 14.8 dBd. Beam width at 3 dB pt.: 16 degrees. Feed Feed impedance: 50 ohm balenced (KLM 1:1 Balun, 144-148-50 optional). Boom dia.: 1½". Boom length: 20.66'. Max. mast size: 1½". Center mounting. Wt.: 10 lbs.

420 MHz...



A versatile series of KLM beam antennas in a variety of configurations: broadband rear-mount type for horizontal or vertical arrangement, ultra-high-gain DX type, and optimized long boom Yagi for narrow-band use. All have VSWR less than 1.2:1 across the entire band. Maximum mast size: 1½".

6-Element
KLM-420-470-6 $19.95

Frequency: 420-470 MHz. Gain: 8 dBd min. F/B ratio: 20 dB min. Beam width at 3 dB pt.: 30°. Feed impendance: 50 ohm balanced (Balun 420-470-50 optional). Boom dia.: 1". Boom lgth.: 2'. Mounting: End or center; horizontal or vertical. Weight: 1.2 lbs.

14-Element
KLM-420-470-14 $31.95

End mountable; vertical or horizontal polarization. Excellent for repeater control. Frequency: 420-470 MHz. Gain: 13.7 dBi. Beam width at 3 dB pt.: 24°. F/B ratio: 20 dB min. Feed impedance: 50 ohm balanced. Boom dia.: 1". Boom length: 4.75'. Wt.: 4 lbs.

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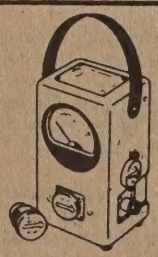

Model 43

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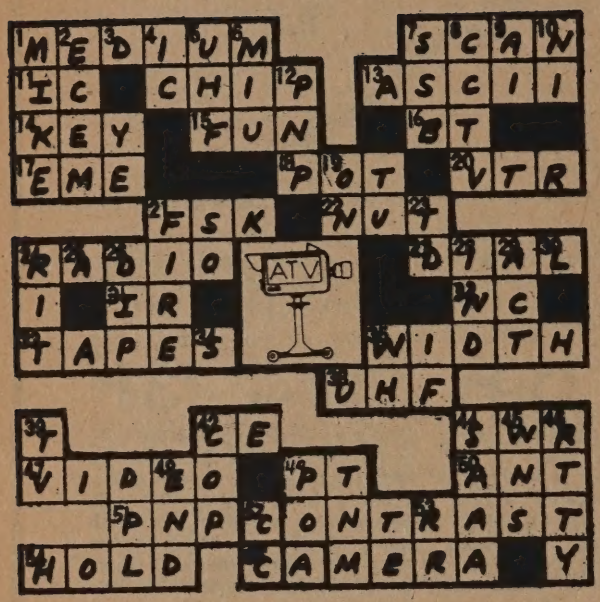
-ANSWERS-

CROSS HAM WORDS

Fast Scan TV SSTV RTTY



BONUS question for an extra year for winner: Who was the TV tar who played Wonder Woman before Linda Carter?? Cathy Crosby, now on "That's Incredible!". Give yourself apat on the back if you got it rig !!!!!

Winner drawn from entries is:

NO ENTRIES RECEIVED BY DEADLINE. BETTER LUCK NEXT TIME

de KBØAE

With springtime here we see nature's signs of life, development and growth in the world. We hope our students are showing similar growth progressing towards their new licenses.

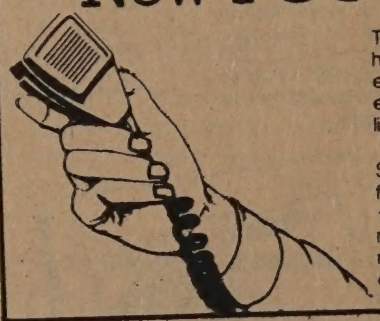
The Courage HANDI-HAM System strives with the rest of the amateur radio fraternity to improve service to the public. As we train people with physical disabilities to become hams, we take pride in their personal growth and development.

The Courage HANDI-HAM System thanks the amateur radio fraternity at large for its contributions to our success. We are proud of the amateur radio service, and hope that all hams conduct themselves in a way that's a credit to amateur radio and the people who enjoy it.

Courage HANDI-HAM System
Courage Center
3915 Golden Valley Road
Golden Valley, Minnesota 55422

MARS

New FCC study guides



The Federal Communications Commission has published study guides for its new examinations, which cover all written elements (2,3,4a and 4b) for an amateur license.

System members and students can obtain free copies of these guides (FCC PR Bulletin 1035; January 1980) by writing HQ. We recommend that all students and members, especially one-to- ones, have a copy or two on hand.

START OUT IN BUSINESS ON TOP

... when it comes to taxes.

Call your local IRS office for details on how you can attend the free Small Business Tax Workshop in your area.

A public service message from the Internal Revenue Service.

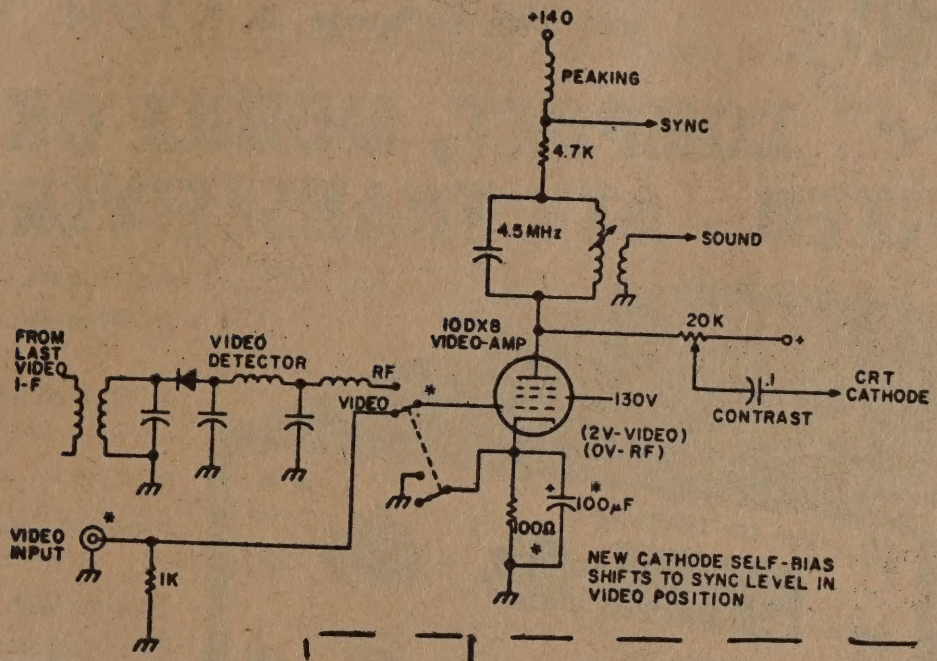
UNDERSTANDING TAXES

is a free course to teach high school students basic tax information—such as how to fill out a Federal tax return, or who has to file a return. Interested in having an Understanding Taxes course in your children's school? Call your local IRS office for details.

A public service message from the Internal Revenue Service.

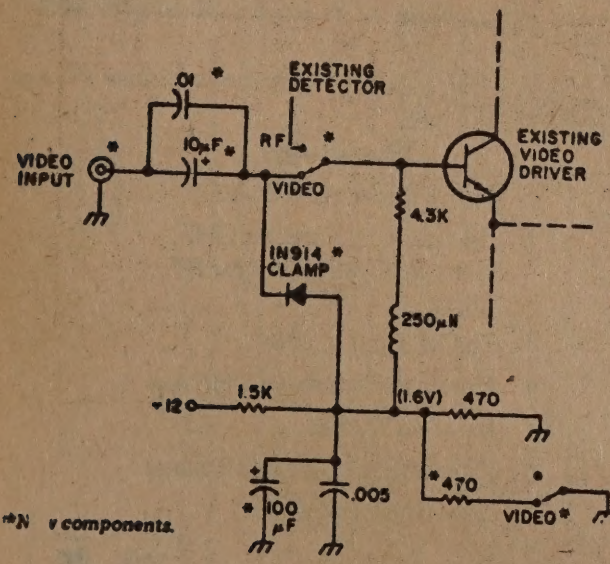
CONNECT YOUR CAMERA TO A TV SET.

Direct coupled video added to tube type B and W television.

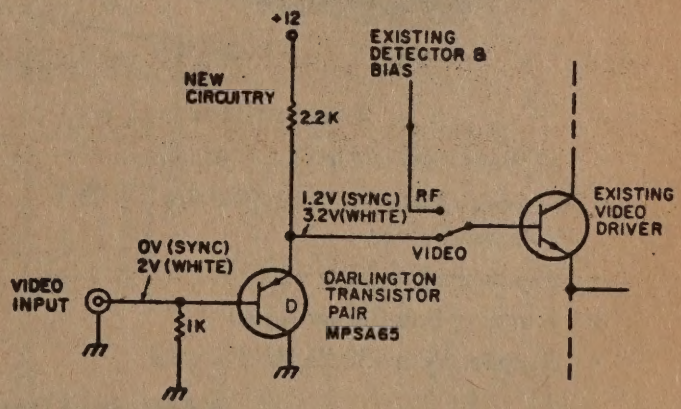


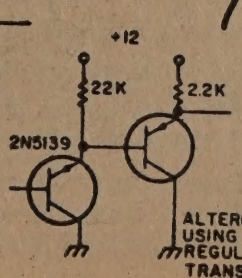
Ac coupled video needs shift of bias to black level plus a clamping diode.

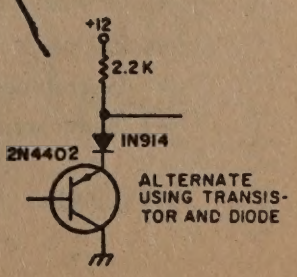
Direct coupled video uses 1.2 volt offset of Darlington transistor as bias.



*N v components.







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Add $25 for optional 2 Stage Pre-Amp

Transmitter:

- 12 Watts Peak Video Output Minimum
- Stripline Linear Final Designed For Wideband Video
- Bandwidth For Color
- Carrier or Sub-Carrier Audio
- Supplied With 439.25 MHZ Crystal

Receiver:

- Tunes Entire ATV Band
- 3 Transistor, Varactor UHF Convertor with Sensitive RF Stage
- Full RF Gain Control
- Connects Directly to VHF Ant. Input on TV Set
- Provision for Optional 2 Stage Low-Noise Pre-Amp

Additional Data:

- Solid-State Transmit/Receive Switching
- Size—10.8"L x 6.2"W x 2.5"H
- Oversized Heatsink
- Enclosure Finished in Durable Epoxy Paint
- Guaranteed with Factory Service Readily Available
- Illuminated Meter — Measures Current of Linear Final Amplifier, 0 - 5amps
  Tuning Scale for Receiver Frequency, 0 - 5
- Switches — Power, On/Off; Xmit/PTT, Overrides PTT on Mic;
  Audio, Center Off, 4.5MHZ Sub-Carrier or On Carrier FM;
  Meter, Amp Current or Relative Receiver Frequency

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SHOP BY MAIL

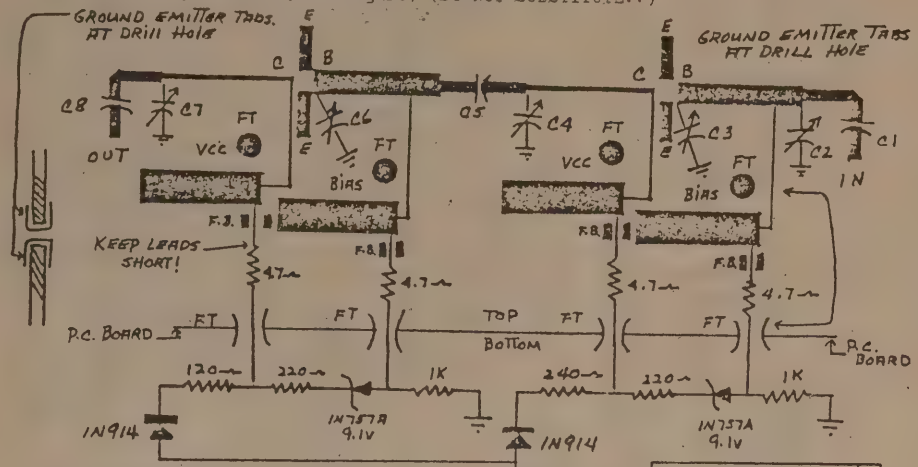
Diane Deibert WA6MVD
24404 Atwood, Ave
Sunnymead, Ca. 92388

1200 Mhz Stripline Preamplifier

****

The information and circuit board provided by WA6MVD for cost is a direct copy designed by Micr-Comm and appeared in October 1975 issue of Ham Radio. Stripline Impedences have not been changed due to the fact that the MRF-901 transistor for it's cost, is your best choice, for this pre-amp. It was felt after having this pre-amp in line, over the past year, that more expensive devices would not have made that much difference. If you want to spend the bucks, you might want to try a MRF-902 or an NEC device in the first stage. This is where the noise figure is determined, but would only make a difference on the weakest of signals. We also found at this station, that the MRF-911 works well in the second stage but you may have to try several in first stage for lowest noise.

This board provided to you, has not been drilled, due to the fact it would be very difficult to purchase all the exact components. The Johannson piston trimmers are hard to find at a cheap cost. Larger sized Johannsons I have found, for a $ 1.00 a piece. They are about ¼" longer and work well as long as minimum capacity is 1pF. It has also been noted that small 50 to 150 pF disk capacitors work as well as the chip capacitors called for. The pre-amp might work without the ferrite beads, but this station prefers to use them. The Zener bias circuit is excellent. The values of resistance have been well chosen, (DO NOT SUBSTITUTE!!) Any change made in resistance value will alter the bias voltages, and affect the gain and noise figure; (DO NOT SUBSTITUTE!!)



INPUT / OUTPUT CONN. GROUND DIRECTLY TO BOTTOM OF P.C. BOARD.

C1, C5, C8 DC BLOCK 50 - 150PF CHIP CAP.

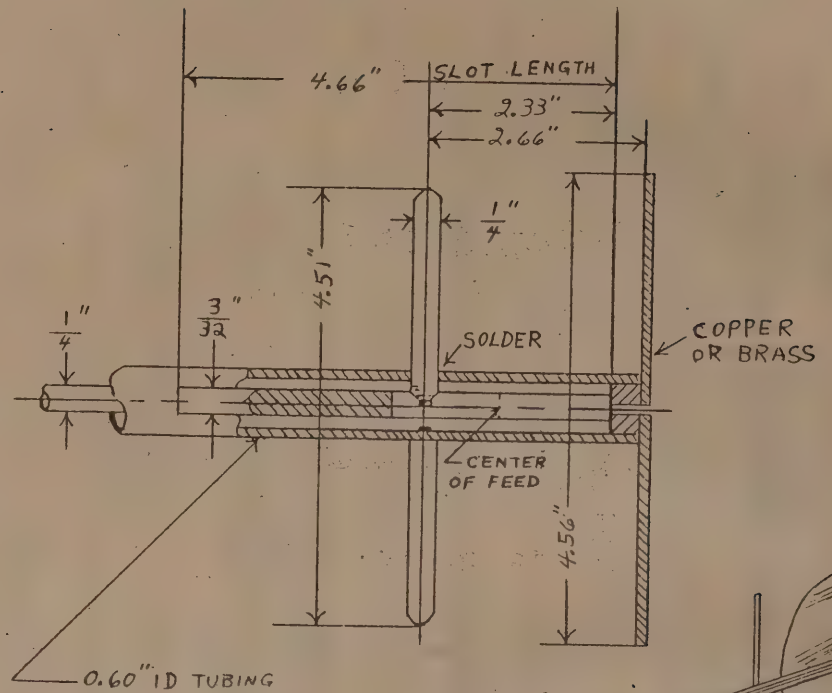
FT 470 - 1000 PF FEEDTHRU CAP.

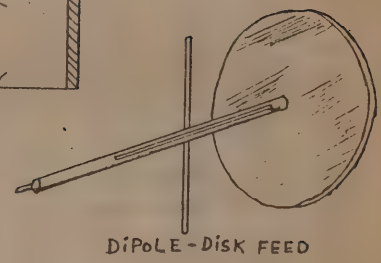
C2, C3, C4, C6, C7 1-5 pF JOHANNSON PISTON TRIMMERS (ATC 100b)

NOTE: EMITTER TABS MUST BE GROUNDED, AT DRILL HOLE, FROM TOP TO BOTTOM OF BOARD. ALL FOUR TABS, USE COPPER SHEET.

SET ALL CAPS TO MIN. CAP. AND TUNE UP FROM THERE.

1265 MHZ DIPOLE ANTENNA





DIPOLE - DISK FEED

W6QDP

MEDIUM DEFINITION NARROW BAND, FOUR-TO-ONE RATIO INTERLACE SCAN SYSTEM FOR AMATEUR TELEVISION:

****

PART ONE:

The development of a practical system of narrow bandwidth television for Amateur Television Communications is of tremendous importance at this time, as we are faced with the loss of at least A5 privileges on the 57 centimetre band. Let us examine the requirements of such a system.
We are all familiar with the 2:1 system of interlace used on commercial television, whose purpose is to allow twice the amount of scan lines to be transmitted in a given time interval with the consequent reduction of both flicker and video bandwidth to scan two interleaved coarse fields in 1/60 seconds each, whose total number of lines, or "frame" is comprised within an interval of 1/30 seconds.
A 4:1 interlace system consists of transmitting each coarse field in 1/60 seconds, whose total number of lines consists of four of these fields transmitted consecutively - within a time interval of 1/15 seconds. This is accomplished thru solid stateintegrated circuit phase lock loop technology and frequency dividers controlled by a crystal.
The field rate frequency, (vertical time-base frequency) must lock to the power mains, and be 60 fields per second, 15 frames per second.
The master frequency is derived by dividing down by 10 from the crystal frequency. The master frequency must end in a zero, and each division stage frequency must also end in a zero, down to the main frequency.
The line rate frequency, (horizontal time-base frequency) must be ¼ of the master frequency, (F mstr.÷4), and must end in the whole number 5.
The total number of lines comprising a frame; when divided by four,must end in ".25" in the lines per field count. A block diagram of an ideal system is shown,after the information here. Only a limited number of different line count systems are mathematically possible, and fewer practical, owing to the impracticability of dividing a great number of times with stability and finding a device capable of a long countdown in commercial production at a reasonable price.

****

Narrow Band Television Scheme:

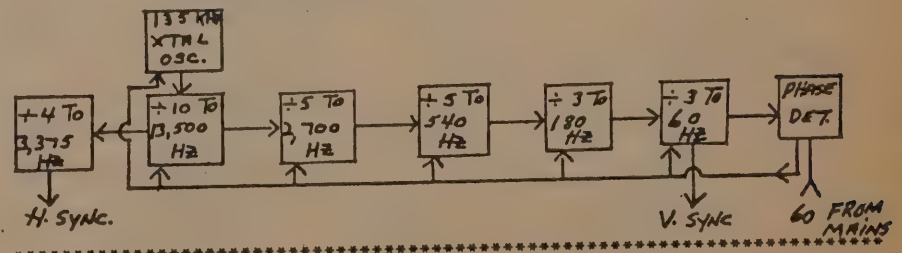
The foregoing is for a 225 line per frame system with a 3x4 aspect ratio. The 3,375 Hz, line rate, (horizontal time-base freq.)÷15 frames/sec. = 225 lines/frame÷4= 56.25 lines per field, (number of lines transmitted in 1/60 sec.) 225 lines, (÷6= 37.5x5*=) 187.5 usable lines for the image*. Total number of pixels vertically used in image; 187.5, times total number of pixels used horizontally in image, 300,= 56,250 pixels in full image transmitted in 1/15 sec.= 843,750 Hz,÷2= 421,875 Hz, Max. Vid. Freq. (225 lines x 300 pixels= 67,500 pixels/frame/sec. x 15 frames/sec.=1,012,500n÷2.4= 421,875 Hz. F Vid. Max.)
*(to continue: 187.5 useable lines = 5/6 of 225 lines.)
The aural subcarrier frequency can be injected on 455 Khz dev.+ or - 5 Khz, NBFM.
A crystal controlled oscillator can drive a video modulated buffer at a frequency of 10.450 Mhz. The output tank is a miller 10.7 FM interstage IF transformer. The bandpass skirt characteristics of the average of these transformers will place 10.450 Mhz 6 db down on the lower sideband skirt, "taking care" of the lower vestigal sideband. An NBFM signal, generated at 10.905 Mhz, which is 455 Khz, above the video carrier, is added and this is fed to a linear SSB type mixer and heterdyned to six meters, above 50.2 Mc. The entire bandwidth of the channel is only one-tenth as wide as commercial tv, and on a fairly small screen set would look about as good as an ordinary tv channel,beleive it or not. Who of us receives studio monitor quality pictures?
The construction of the PCB with integrated circuits should be an easy matter.
Conversion of most tv cameras,especially vacuum tube models, should entail no great problems.Tv receivers, again, are no problem, especially "vac" tube jobs. The vertical circuit is left alone. The horizontal Osc/Amp. will happily continue to supply the high voltage, (E.H.T.) The horizontal deflection coils will be disconnected from the horizontal output transformer and connected to the output of a universal modulation transformer. The A.F.C. circuit is likewise disconnected from the horizontal output transformer. A new circuit oscillating at 3,375 Hz is built, using the same A.F.C. setup. A 6L6 should drive the horizontal yoke nicely. Damping should not be needed, as the horizontal freq. is very low compared to 15,750 Hz of commercial tv. The image would be sufficiently detailed to be viewable on a 12" screen at six feet, and look almost as good as a commercial tv station, if not as good as most tv reception. Think carefully about this proposal, a 600 Khz, maximum bandwidth tv channel with excellant picture quality on upper six meters by experimental consent of the FCC? It is possible to save the 52 to 54 Mhz region from being "gobbled up" by the big corporations, as is now planned.

73's WB6FHD.

****

Circuit from Page 1.

****



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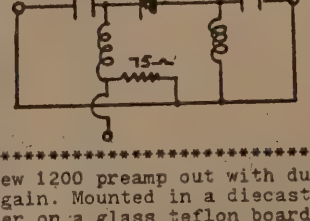
PIN DIODE MODULATOR: BY WB6OFG:

Pin diode video modulators are a new avenue to an old problem of obtaining wideband, flat modulation performance on any frequency. Example, if your rig has a mixer, you can video modulate either signal in, or the output of the mixer. Stable video performance can be expected from 50 to 11,500-Mhz. Power in must be 3 db greater than desired peak video out. Power handling will approach 5 watts. One watt should be possible with greater video modulation level.

2 Caps. Silver Mica
Red Beads, 62 to 120 pf

2 each 2uH chokes made
with 22 gage wire
a wire loop thru two
ferrite beads.



****

Spectrum International has a new 1200 preamp out with dual 901's spek'd at 2.5 db nf and 18 db gain. Mounted in a diecast box with BNC's. Has a microstrip bandpass filter on a glass teflon board. Price is $69.95. Model # is MMa 1296.

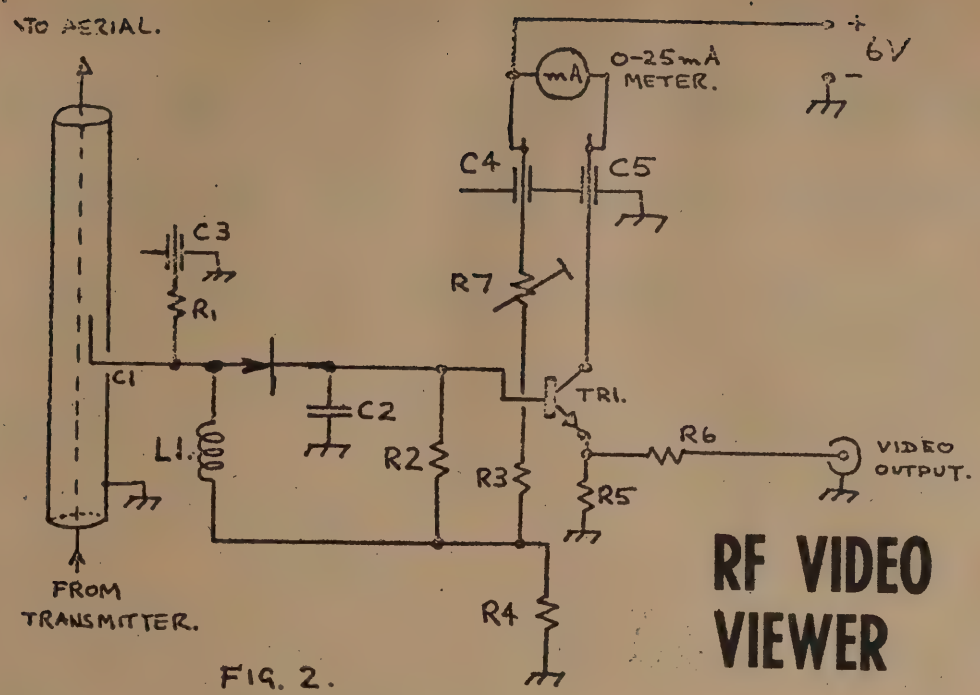


FIG. 2.

RF VIDEO VIEWER

COMPONENT LIST.

C1	SEE TEXT	R_1	SEE TEXT
C2	3·3 pF. CERAMIC DISC	R_2	2·2 KΩ ±20% $\frac{1}{10}$ W
C3	100 pF FEED THROUGH.	R_3	220 Ω " "
C4	1,000 pF " "	R_4	220 Ω " "
C5	1,000 pF " "	R_5	1K Ω " "
X_1	GEX 66.	R_6	56 Ω " "
TRI.	2N697,	R_7	500 Ω. pot.

L 1. R.F. CHOKE. 12 TURNS. $\frac{1}{8}$" DIA. 26 S.W.G. ENAMELED COPPER WIRE.

No point tryn' to give him a rubdown when 10 meters is open!

One of the toughest competitors at the Winter Olympics was no amateur.

To look at a Hitachi GP-4 camera and its under $1,000 price tag, you might think it was strictly an amateur camera. It's that small and light and easy to use.

But when you look at the pictures it makes, you know it's a pro. And you did look at GP-4 picture quality, everytime you "rode" down the bobsled or luge courses while watching ABC's coverage of the Winter Olympics. There were two GP-4's mounted on sleds and capturing all the heart-stopping action of those 80 mph downhill runs.

It took a special camera to live up to that assignment. Naturally, ABC tested bigger, more expensive cameras first. But the GP-4 was ideal for many reasons. It was one of the world's smallest, lightest, most rugged color video cameras. Its simple single tube design eliminated registration adjustments. And its award-winning Tri-Electrode Vidicon tube produced broadcastable pictures with low lag and outstanding color fidelity. Not to mention the GP-4's low light sensitivity and easy interface with a standard 3/4" portable VTR without modification. In fact, the only modification was the addition of a wide angle lens.

Not all the sleds survived, but those GP-4 cameras did. Battered but unbowed, they're still in use at ABC for training purposes. Now that's tough, and that's professional. That's Hitachi GP-4...the camera for all reasons...and all budgets.

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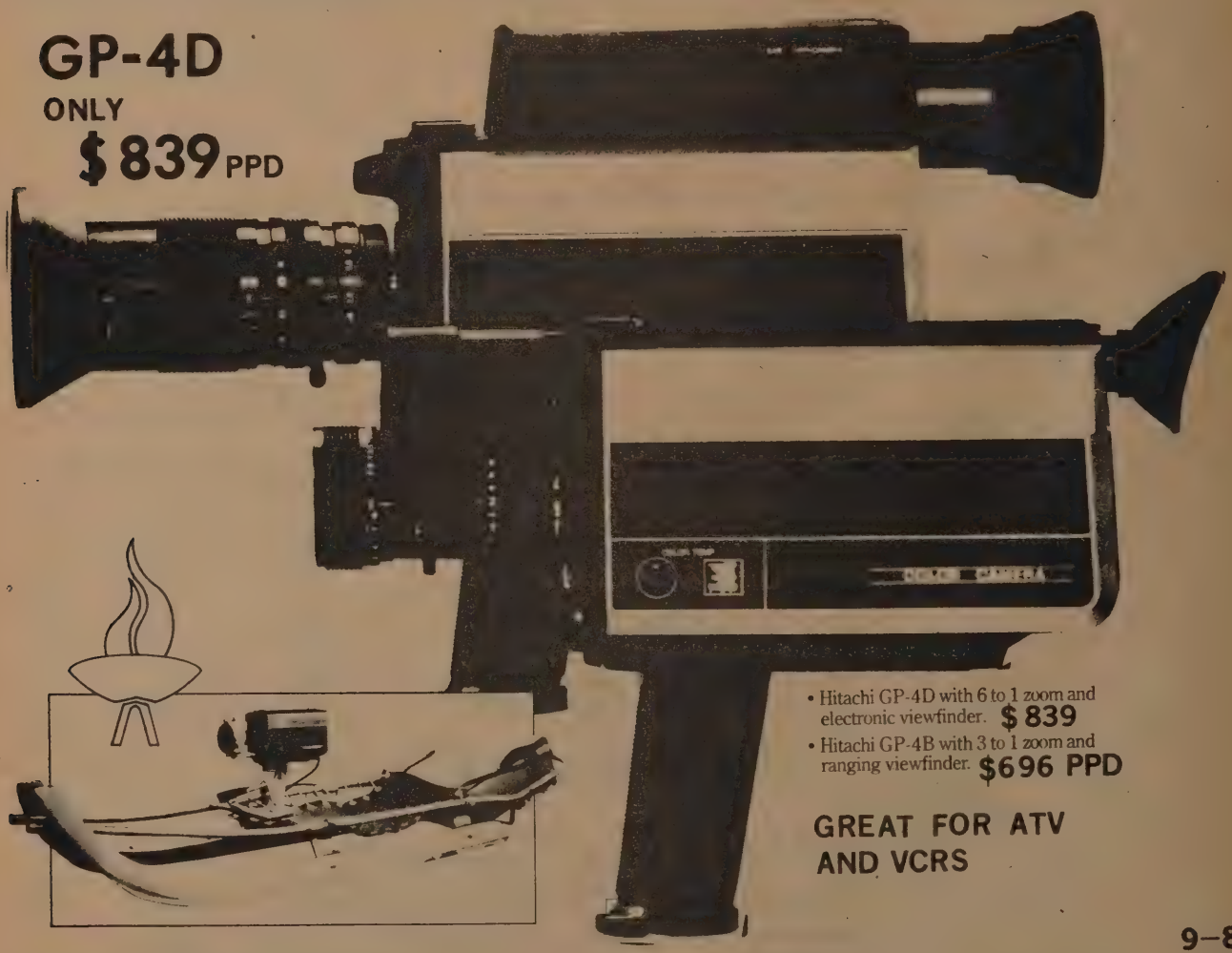

- Hitachi GP-4D with 6 to 1 zoom and electronic viewfinder. **$839**
- Hitachi GP-4B with 3 to 1 zoom and ranging viewfinder. **$696 PPD**

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- DX is about the same as 2 meter simplex - 15 to 100 miles.
- ATV uses broadcast standards. No special converters needed. Receive full color and sound on a regular TV set.

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Plug in any closed circuit camera, antenna, mic., and TV set and you are on the air. Contains the basic four modules, AC supply, and T/R switch. Full color and sound. Specify xmtr freq and TV ch 2 or 3.

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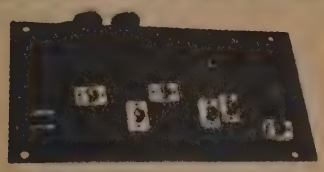
HITACHI HV62U CAMERA . . . . . $239 ppd

Build Your Own System with The Basic Four Modules



1. TXA5- ATV EXCITER/MODULATOR . . . . . $85 ppd
This wired and tested module is designed to drive the Motorola MHW-710 module in the PA5 10 watt linear amp. The crystal in the 100 mHz region keeps harmonics out of two meters for talk back. The video modulator is full 8 mHz for computer graphics and color. Requires 13.8 vdc reg @ 70 ma. Tuned with xtal on 439.25, 434.0 , or 426.25 mHz. Two Freq version add $30.

2. PA5 10 WATT ATV POWER MODULE . . . . . $79 ppd
The PA5 will put out 10 watts RMS power on the sync tips when driven with 80 mw by the TXA5 exciter. 50 ohms in and out, plus bandwidth for the whole band with good linearity for color and sound. Requires 13.8 vdc regulated @ 3 amps.

3. FMA5 AUDIO SUBCARRIER GENERATOR . . . . . $25.00 ppd
Puts audio on with your camera video just as broadcast TV does at 4.5 mHz. Puts out up to 1 v p-p to drive the TXA5 or VM-2, 3, or 4 modulators. Requires low Z mic (150 to 600 ohms), and +12 to 18 vdc @ 25 ma. Works with any xmtr with 5 mHz video bandwidth.

4. TVC-2 ATV DOWNCONVERTER . . . . . $49.50 ppd
Very sensitive MRF901 (1.7 db NF) preamp and double balanced mixer module digs out the weak ones but resists intermods and overload. Connects between uhf antenna and TV set tuned to channel 2 or 3. Tunes 420 to 450 mHz. Requires +12 to 18 vdc @ 20 ma. Super sensitive TVC-2 with NE64535 preamp (.9db NF) preamp $79.50 ppd

TVC-4 ATV DOWNCONVERTER . . . . . $85.00 ppd
This is a packaged version of the TVC-2 converter with internal power supply. Has BNC input and F output connectors. Also available with the NE64535 for $115 ppd. Size 5¼ x 2½ x 7 inches.

9-80

PACKAGE SPECIALS

TXA5-3, PA5, FMA5, and TVC-2
BASIC MODULE PACKAGE . . . . . $225 ppd

OPTIONS:
2 frequency exciter . . . . . add $30
NE64535 low noise downconverter . add $30
Packaged TVC-4 downconverter . . . add $35

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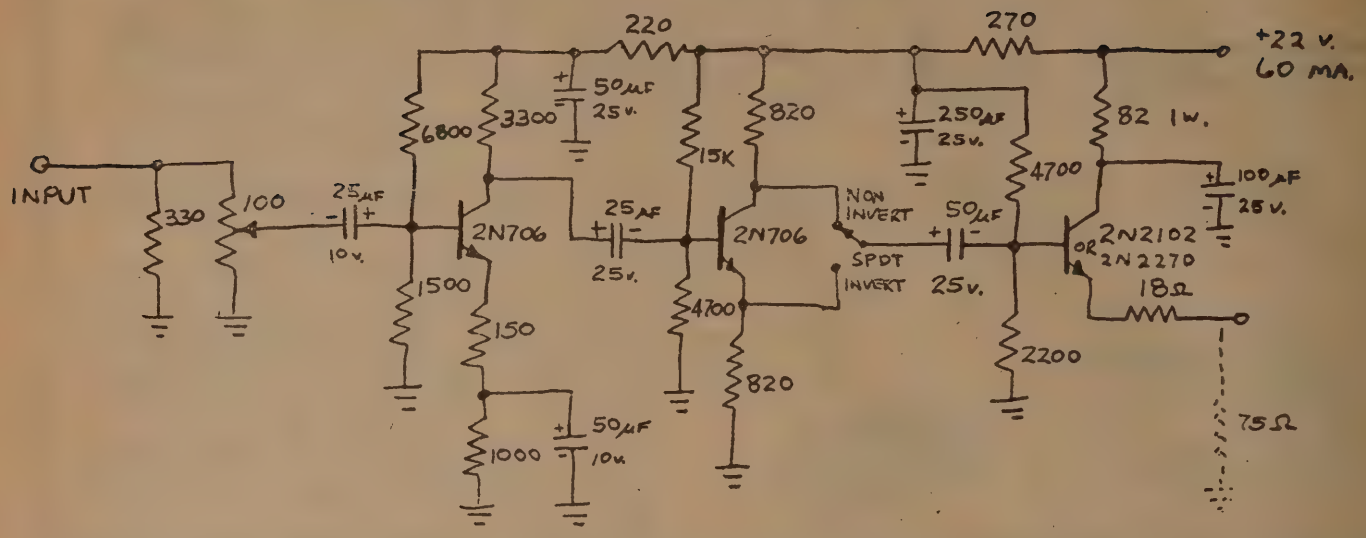
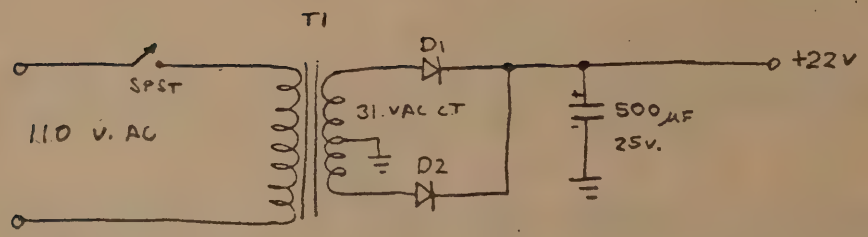
VIDEO LINE AMPLIFIER



All unmarked resistors ½W or less.

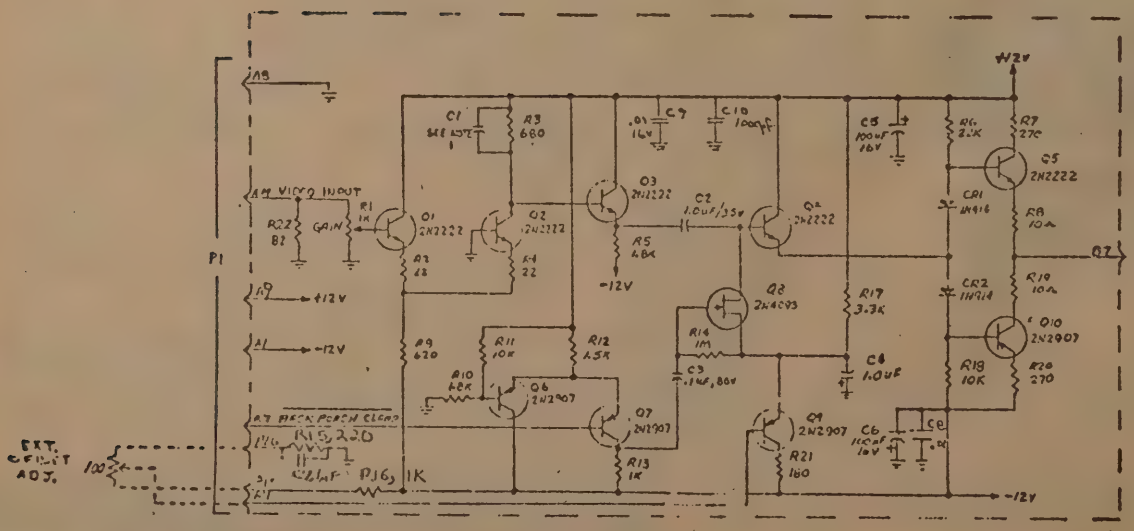


All capacitor values shown are minimum values, larger capacitors may be used
100 uF at 50V – 10 cents.
250 uF at 25V – 10 cents.
(Esse Radio)

Gain – 5 times.
Bandwidth – ± 1 DB 30 CPS - 10 Mc.
Max output – 4V Peak to Peak
Output must be terminated with 68-82 Ohm resistor at end of output cable.

T1 – 31 VCT 660 Ma (Graham Electronics 79 cents.)
2N706 – 90 cents.
RCA 2N2102 – $1.41.
RCA 2N2270 – $1.16.
D1, D2 – 100 PIV or higher

M. TALLENT – W9HWX.



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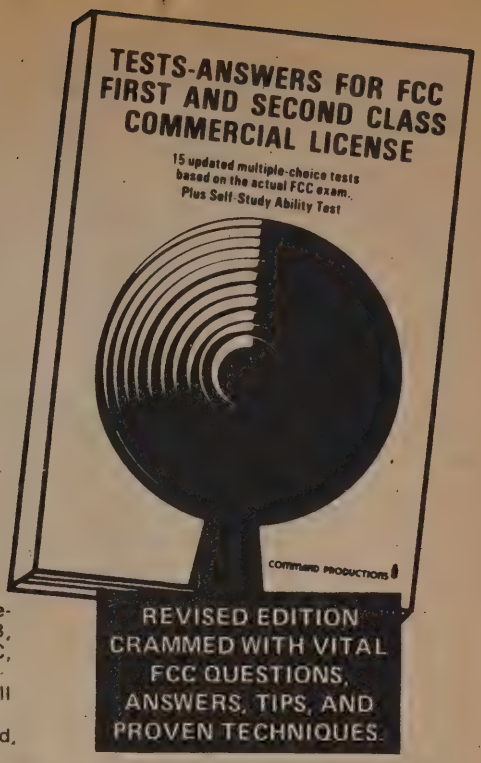
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- This important federal license is a legal requirement which allows one to operate all radio and television Broadcast stations in the United States.
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- With the recent introduction of the "Mini-Cam," the latest in television video news reporting, an FCC license is a prerequisite.
- The latest craze is the Citizen Band Radio. With millions of "CB" sets in use today and hundreds being sold daily, certified personnel are needed to repair and tune these sets. These service personnel are also required to be licensed by the FCC.
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TV

Simple stair-step generator uses 1 IC and 3 transistors

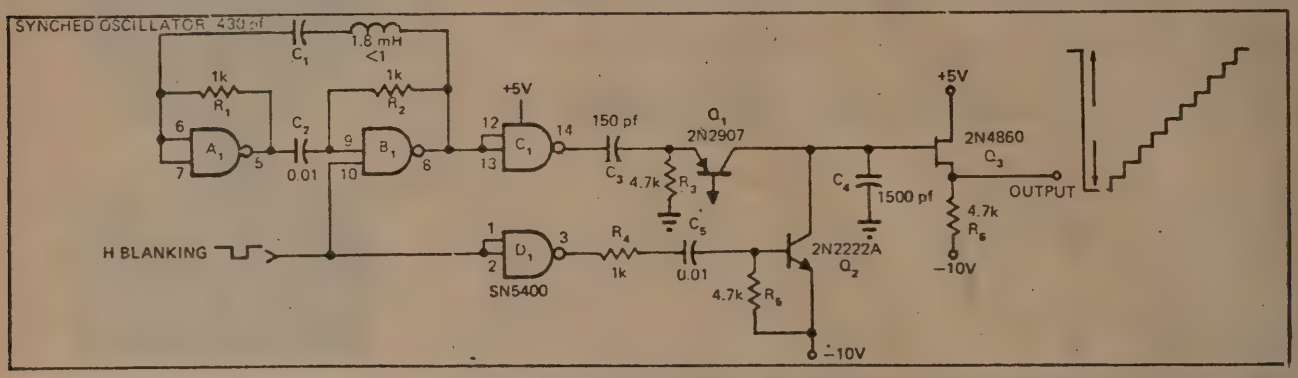
Edwin E. Morris
General Electric Corp., Utica, N.Y.

Synchronized stair-step generators are needed for, among other things, a gray-scale test signal for television equipment.

The illustrated circuit is a synchronized LC oscillator driving the stair-step generator, both of which are reset by the horizontal-blanking input signal.

The synched oscillator is a simple, positive-feedback LC oscillator composed of two TTL gates biased at their linear range by negative feedback resistors R_1 and R_2. With a LOW input on pin 10 of G_1, pin 8 goes to its HIGH output level regardless of the input on pin 9. During this OFF condition, C_1, C_2 and L_1 assume their steady state conditions. As a result, the oscillator always starts in the same condition.

The circuit generates a stair-step by integrating a train of equally spaced pulses. The voltage across C_4 is −10V at



Synchronized stair-step generator, designed as a gray-scale test generator for video equipment, is reset by the horizontal blanking signal

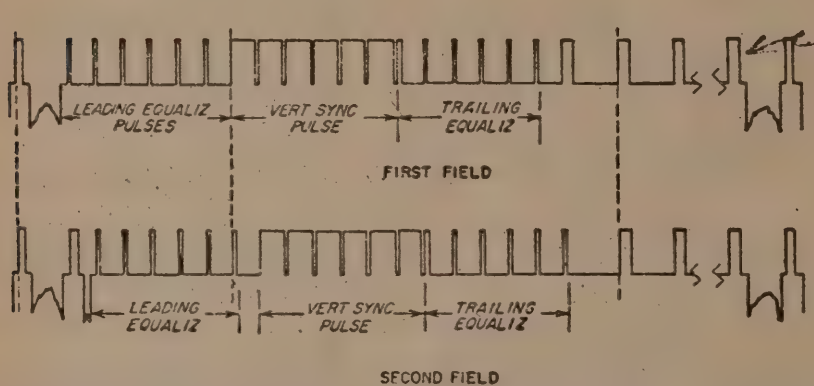


Fig. 17-10. Standard sync presentation showing horizontal pulse alignment and half-li shift of alternate vertical pulses.

TV SYNC

Standard	American system
Method of sound modulation	Fm
Maximum deviation	±25 kc per sec
Preemphasis time constant	75 μsec
Method of picture modulation	Am, vestigial sideband
Maximum modulating frequency	4 mc per sec
Maximum horizontal resolution	320 lines
Attenuated sideband	Lower
Width of flat portion of attenuated sideband	0.75 mc per sec
Width of slope of attenuated sideband	0.5 mc per sec
Width of slope of fully transmitted sideband	0.5 mc per sec
Polarity of picture modulation	Negative
Maximum peak of modulation envelope (= 100 per cent)	Sync peaks
Blanking-pedestal amplitude	75% ± 2.5%
Black-level amplitude	†
Peak-white amplitude	15% + 0% −15%
Sync-peak amplitude	100%
Amplitude characteristic	See Fig. 2-7B
Phase characteristic	Not specified
Transfer characteristic	Substantially logarithmic

TV STANDARDS

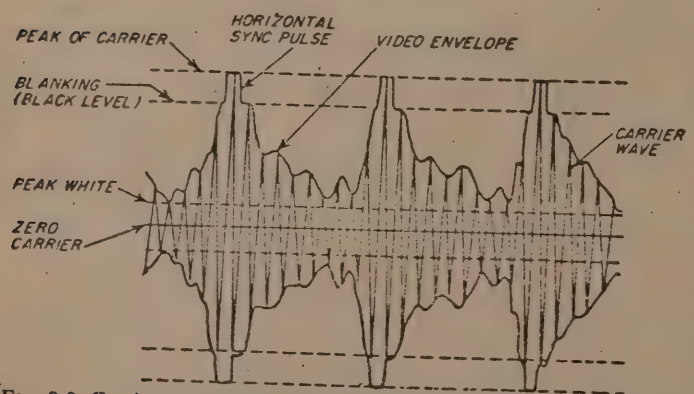


Fig. 2-2. Carrier signal and modulation envelope, negative modulation.

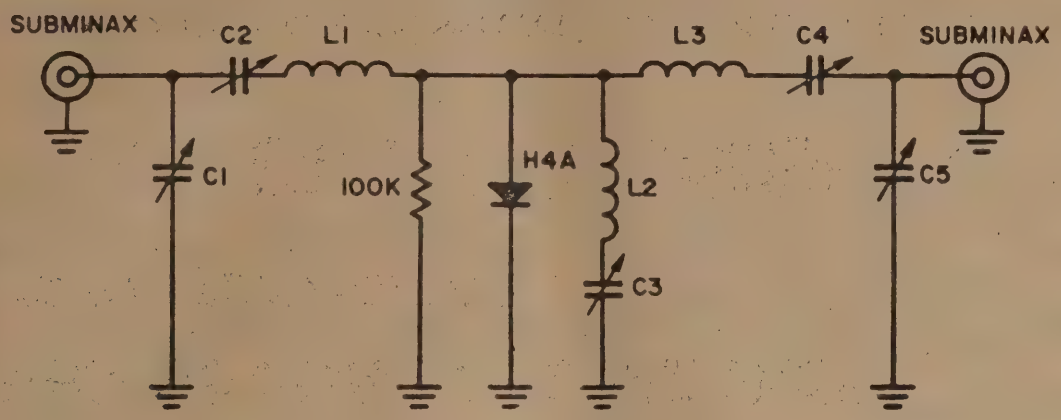
ATV RF WAVEFORM

1N4885 (H4A)
1N4886

430 MHZ DRIVER FOR TUBE AMP.

150 Mc TO 450 Mc TRIPLER CIRCUIT DESCRIPTION

W9NTP



L_1 = 6 1/2 turns #16 wire 19/64 I.D. L = 9/16"
L_2 = 2 turns #12 wire 17/64 I.D. L = 5/16"
L_3 = 1 x .25 x .020 copper strip, 9/16" from bottom
C_1 = Arco 423, 7-100 pf
C_2, C_3, C_4 = E. F. Johnson, type U, 2-13 pf
C_5 = Arco 421, 2-25 pf

Figure 7. Frequency Tripler Circuit - 150 Mc to 450 Mc

The above tripler circuit consists of a parallel connection of the varactor, the input and output circuits, and the idler circuit. This shunt configuration has two outstanding advantages for high power harmonic generation.

1. The varactor can be grounded on one side, thus utilizing the chassis as a heatsink.

2. The varactor, being a low impedance device, operates best in a circuit that requires a low impedance coupling element between input and output circuits.

The function of the input and output networks is to provide impedance matching, and at the same time eliminate undesired R F current components, minimizing losses. A single tuned circuit is insufficient for the reduction of spurious response and therefore, a suitable output filter should follow the multiplier.

For further detailed information see Application Laboratory Reports #S-124 "Designing Varactor Triplers Using 1N4885 (H4A) and 1N4886" and #S-125 "Coupling 8458 Driver To The 1N4885/H4A Tripler".

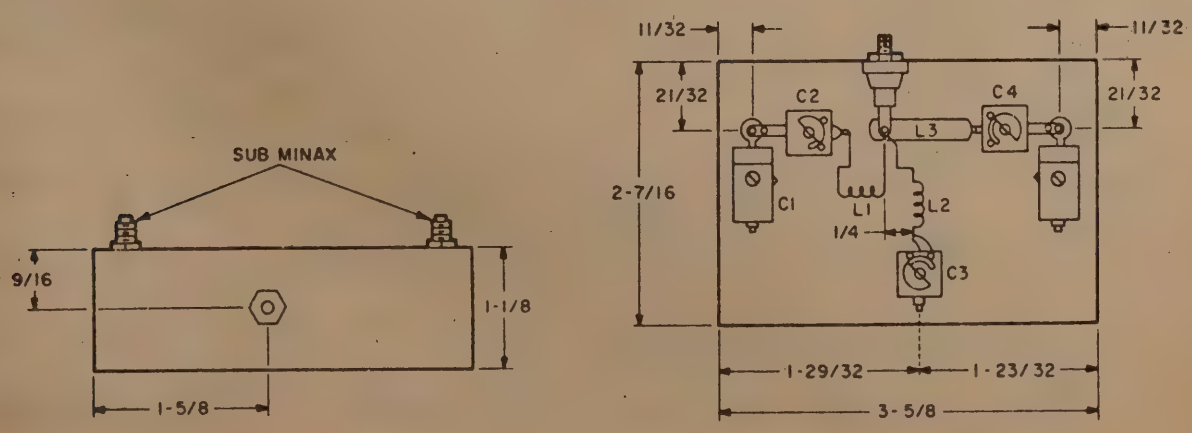
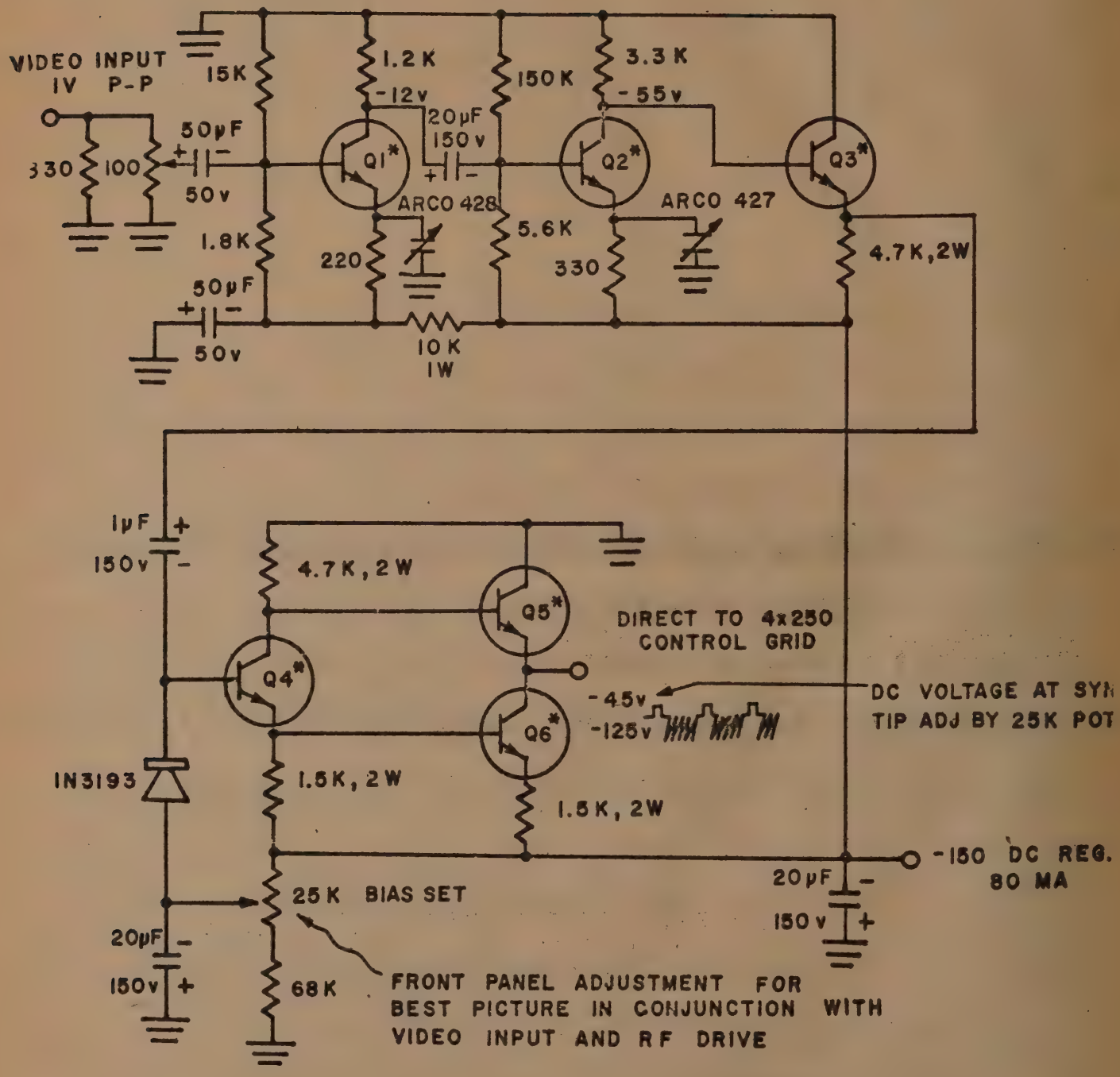


Figure 8. Component Layout of Tripler Circuit

VIDEO CONTROL GRID MODULATOR



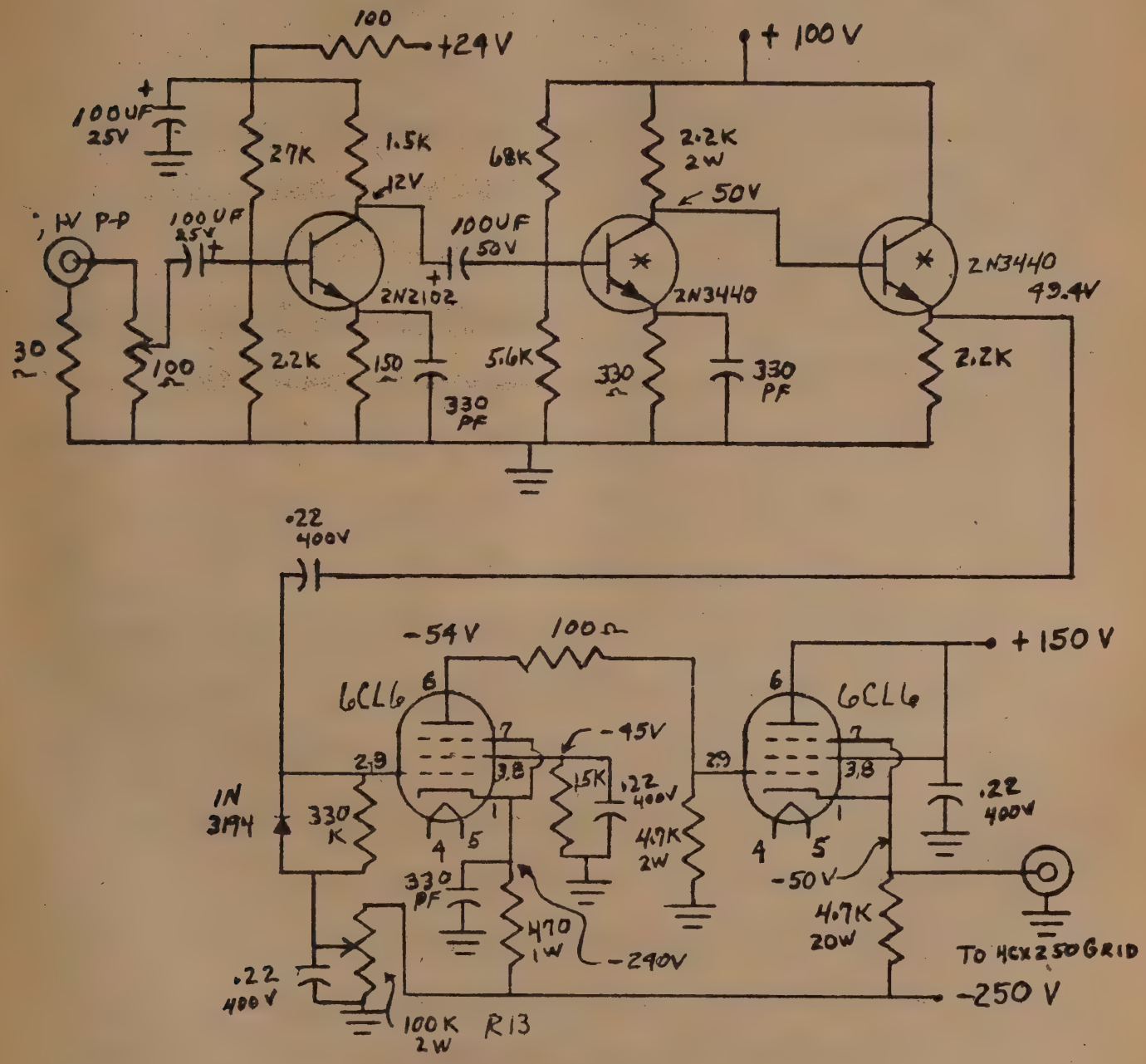
Q1- 2N2102, 2N2270

Q2-Q6- 2N3440, MJ420, MJ421

* Heat Sink

Designed by M. Tallent W9HWX

HYBRID MODULATOR



NOTES

1 Voltages shown are approximate and with no input , and with R 13 set at _ 250 V

2 330 pf are high frequency peaking cap. and can be adjusted for req. band width

3 If collector voltage of Q1 Q2 is not within 20% of ind. values change 27K and 68K

4 If _50 Volts is not obtained at cathode of V2 adjust 15K in screen of 1st 6CL6

* denotes heat sink

GRID MODULATOR

Designed By Mike Tallent W9HWX

Drawn By L. Whitlock WA9TMH

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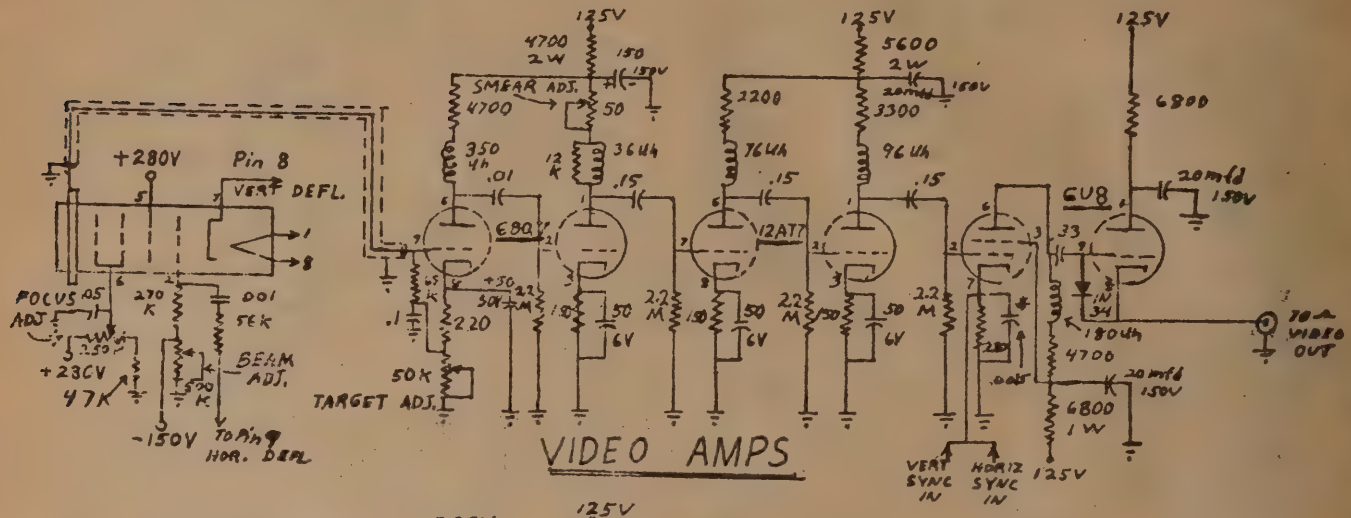
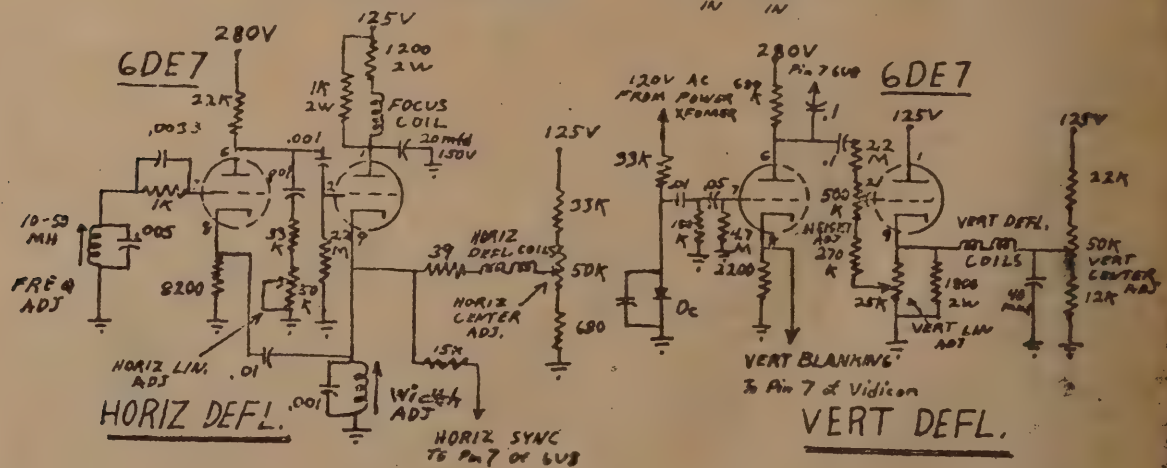
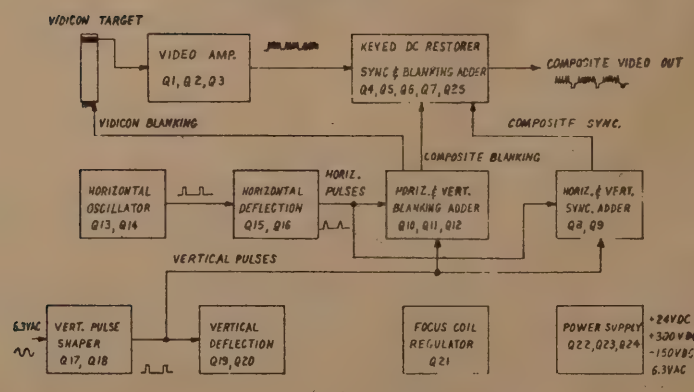




BLOCK DIAGRAM



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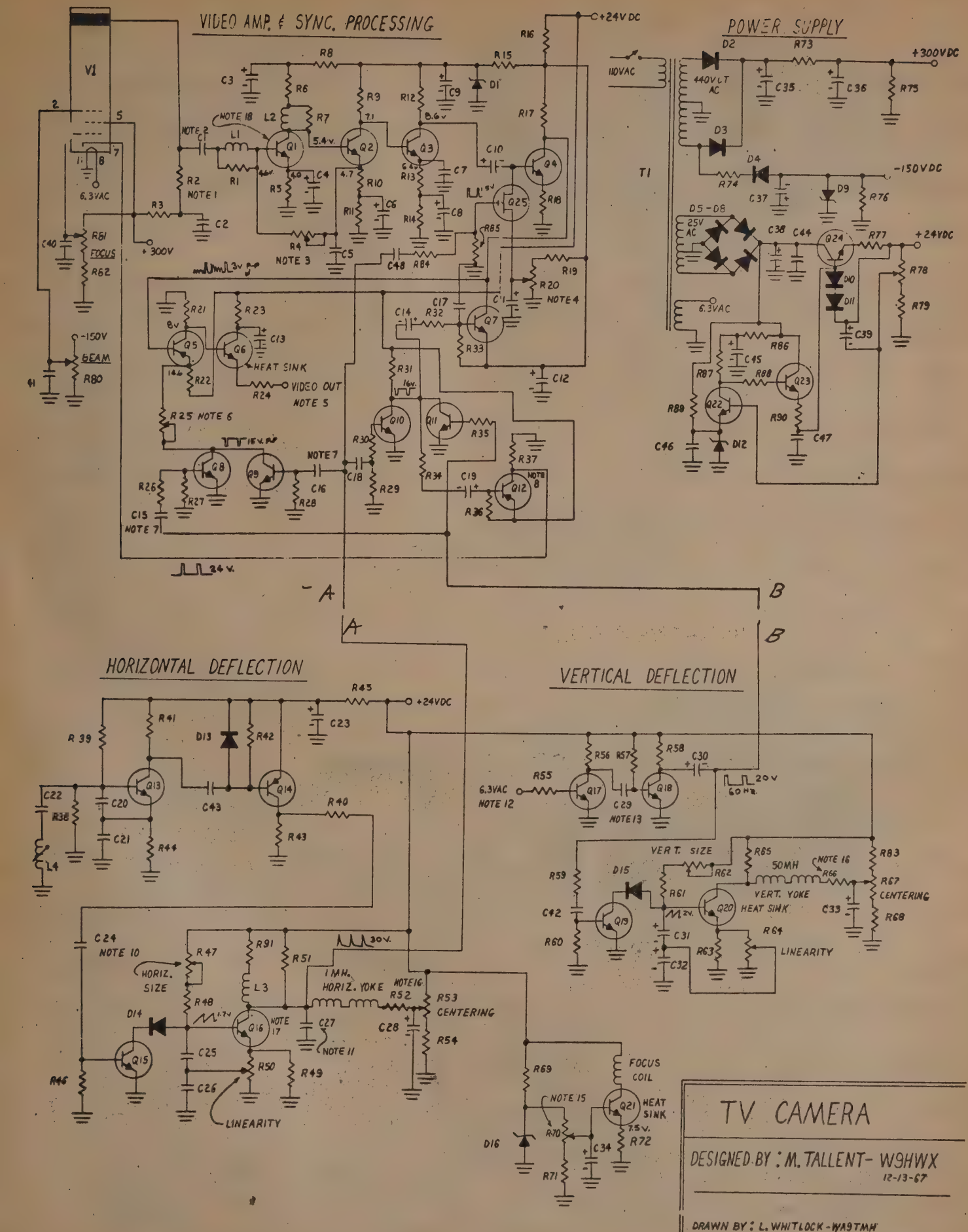
DRAWN BY: L. WHITLOCK WA9TMH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-150VDC
+24VDC
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440VCT AC
25V AC
6.3VAC
-150V BEAM
+300V
HEAT SINK
VIDEO OUT
NOTE 1
NOTE 2
NOTE 3
NOTE 4
NOTE 5
NOTE 6
NOTE 7
NOTE 8
NOTE 10
NOTE 11
NOTE 12
NOTE 13
NOTE 15
NOTE 16
NOTE 17
NOTE 18
HORIZ. SIZE
LINEARITY
1MH. HORIZ. YOKE
VERT. SIZE
50MH
VERT. YOKE
CENTERING
FOCUS COIL
TV CAMERA
DESIGNED BY: M. TALLENT- W9HWX
12-13-67
DRAWN BY: L. WHITLOCK - WA9TMH
5-10-68

R1, R34, R35, R36, R41, R43, R60	4.7K
R2	1000 MEG
R3	470 K
R4, R25	50K POT
R5, R8	6.8K
R6, R11, R58, R59, R86, R87	1.5K
R7	5.6K
R9, R12	1.2K
R10	56
R13, R90	120
R14, R19, R31, R40, R61	3.3K
R15, R65, R83	220
R16, R51, R71	470
R17, R27, R28, R32, R44, R55, R88	1K
R18, R72	150
R20, R67, R70	500 POT
R21, R45	560
R22, R68	680
R23	120, 1W
R24, R63	68
R26	3.9K
R29	15K
R30, R42, R57	10K
R33	22K
R37, R46, R56, R79	2.2K
R38	33K
R39, R82	220K
R47, R64	5K POT
R48, R51	390
R49	10, 2W
R50, R53, R78	1K POT
R52, R66	10
R62	10K POT
R69	820
R73, R89	2.7K
R74	47K 1W
R75	100K 2W
R76	220K 1W
R77	0.47, 2W
R80, R81	100K POT
R84	150K
R85	47K
R91	22, 2W

Q1, 2N3563, MPS 3563	See Note 18
Q2, Q3, Q4	2N3563, MPS 3563
Q5	2N3640, MPS 3640
Q6, Q20, Q21	2N2102, 2N2270
Q7, Q12, Q14	2N3638, MPS 3638
Q8, Q9, Q10, Q11, Q17, Q18	2N3646, MPS 3646
Q13	2N3694, MPS 3694
Q15	2N3568, 2N2102
Q16	2N3442, 2N3055
Q19	2N3568
Q22, Q23	2N3642
Q24	2N3055
Q25	2N3819, MPF 105
V1	7735, 4478
D1	12V, 1 W Zener
D2, D3, D4	1N3195
D5, D6, D7, D8	1N3194, 1N4002
D9	150V, 1 W Zener
D10, D11	1N4003
D12	20V, 1 W Zener
D13, D14, D15	1N914
D16	12V, 1 W Zener

C1	.01, 400V See Note 2
C2, C40, C41	.1, 400V
C3, C6, C8, C11, C39	25 µF. 15V
C4, C9, C34	50 µF. 15V
C5, C7	330 pf
C10	5 µF. 15V
C25, C26, C29	.22
C12	100 µF. 25V
C13, C19, C28, C31, C32	25 µF. 25V
C14, C23, C30	10 µF. 25V
C15, C21, C22	.022
C16	.0047
C17, C24	470 pf
C18, C42	.047
C20	.033
C27	.0022
C33	250 µf. 25V
C35, C36	10 µf. 350V
C37	30 µf. 250V
C38	500 µf. 50V
C43, C47	.1
C44	.27
C45	25 µf. 90V
C46	.39
C48	100 pf

L1 - 68 µH. J. W. Miller Part No. 70F6861
L2 - 100 µH. J. W. Miller Part No. 70F10441
L3 - 250 turns #32 wire on Indiana General TC7-02 Cup Core (Newark Electronics Cat. No. 59F1501)
L4 - 15mH adjustable coil set for 15,750 HZ. Horiz. Freq.
Focus Coil - Cleveland Electronics Cat. No. VF-142 (200 Ω, 50 MA., 5500 turns #28 wire)
Deflection Yoke - Cleveland Electronics Cat. No. VY101
Horizontal Coil 1mH, 3.5 Ω
Vertical Coil 50mH, 165 Ω
T1 - Stancor PC8417

NOTES

1. R2 is used to achieve some automatic gain for changing light levels.
2. C1 should be a good low leakage disc capacitor.
3. R4 is used to set overall video gain and also is a variable aperature peaking.
4. R20 is black level set. It should be adjusted such that black areas of picture just extend down to blanking level at video output.
5. Video output should be terminated in 75 ohms to provide a DC path for Q6.
6. R25 is sync level adjustment. It should be set for proper sync to video ratio.
7. C16 determines horz. sync width.
   C15 determines vert. sync width.
8. Q12 is directly connected to vidicon cathode and provides DC path for vidicon and also retrace blanking.
9. Omitted.
10. C24 is used to obtain the keying pulse for Q15. If retrace time is longer than standard horz. blanking (11us.) it can be changed to correct retrace time.
11. R51 is used to reduce yoke "ringing". C27 is used to improve sweep linearity following retrace, it may not be needed in all cases.
12. 6.3 V.A.C. in vert. deflection is obtained from filament of vidicon.
13. C29 is used to set vertical blanking width (approx. 1.5 ms.)
14. Q20 requires small heat sink such as Wakefield #WF207 (Allied Radio #60C6530) Q6 also uses heat sink above. Q21 also uses heat sink above.
15. R70 adjusts current through focus coil.
16. R52, R66 are test resistors used to monitor yoke current.
17. Horizontal output transistor Q16 and power supply regulator Q24 should be mounted to large area heat sink such as camera chassis.
18. First video amp. Q1 should be low noise. A reduction in camera noise may be made by trying different 2N3563 (MPS3563) transistors and choosing one with lowest noise in picture.

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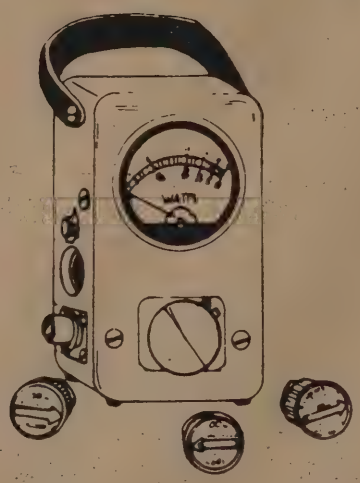

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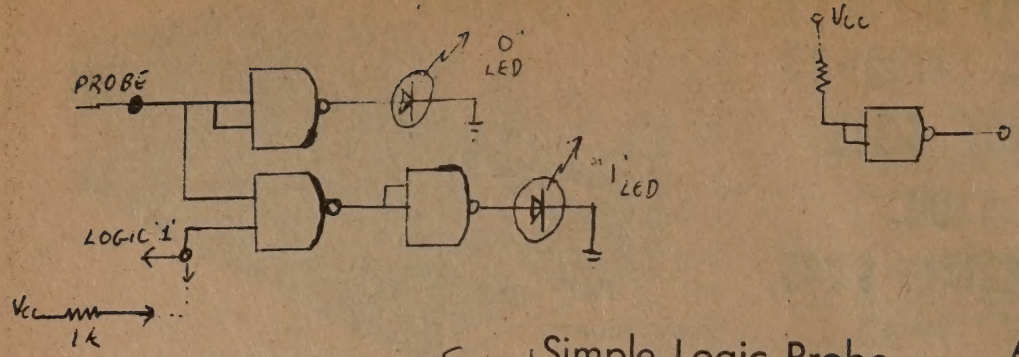

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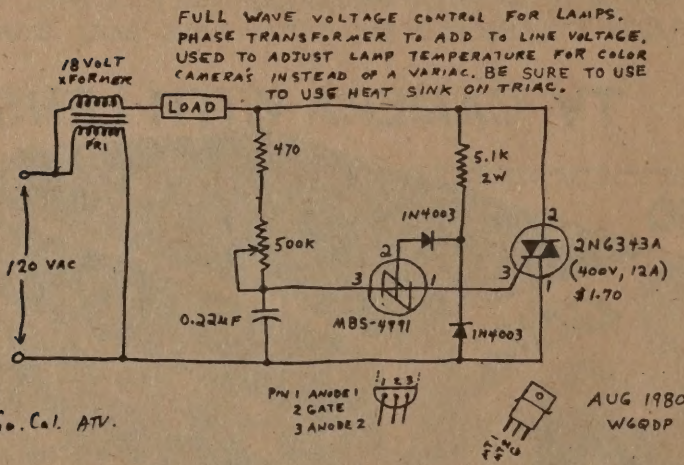
A5 Staff

HR REPORT: BY W6ORG:

England has proposed CB, (what's that?) for the new 900-Mhz band. We should still have it for Ham but it means that gear will be more available. Court case between makers of "Pirate" subscription TV equipment was won by the Pirates this month. It has gone on to the next higher court, however, and they intend to take it all the way ... only the lawyers get rich on this one. A dangerous precident may be set if passage of house Bill, HR-7747, is in Committee proposing to prohibit reception of these private communications. To date the airwaves have been free to listen to, but were illegal to divulge or use for benefit the information contained in the transmission of private communications. Does this mean we have to sell our Bearcats now while we can? Write your Congressman. BIG HAWAII - CALIF. VHF/UHF DX path openings started July, 22, with KH6HME's 432 beacon being heard. KH6IAA went to Mauna Loas 8000 foot level and worked N6NB, and WB6NAT, in 432 and 144 SSB, and AA6DD, on 220 FM. Best path since 1959 they said.



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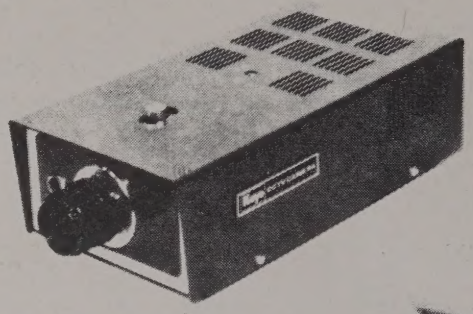

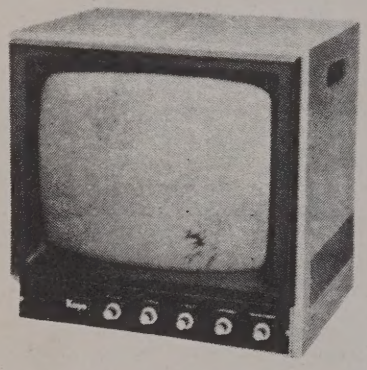

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